Notice No.5

Rules and Regulations for the Classification of Special Service Craft, July 2021

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2022

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Part 3, Chapter 4, Section 7	1 July 2022	N/A
Part 3, Chapter 7, Sections 1 & 2	1 July 2022	N/A
Part 4, Chapter 2, Section 10	1 July 2022	N/A
Part 6, Chapter 6, Section 1	1 July 2022	N/A
Part 7, Chapter 6, Section 1	1 July 2022	N/A
Part 8, Chapter 6, Section 1	1 July 2022	N/A

Part 3, Chapter 4
Closing Arrangements and Outfit

■ *Section 7*
Portlights, windows and viewing ports, skylights and glass walls

7.1 General

7.1.5 ~~Glass in portlights, windows and skylights is to be thermally toughened safety glass with a thickness in accordance with approved plans or a recognised National or International Standard relative to their location.~~ Monolithic glass panels are to be thermally toughened safety glass. Laminated glass panels can be made of annealed glass, heat strengthened glass, chemically strengthened glass or thermally toughened safety glass.

7.1.6 Where consideration is given to the use of glazing materials other than thermally toughened glass, the thickness and arrangements are to take account of any different material properties in accordance with a recognised National or International Standard and are to be individually approved and tested as appropriate or be in accordance with LR's Type Approval Procedure.

7.8 Toughened safety glass thickness

7.8.1 The thickness, *t*, of toughened safety glass, which is continuously supported, i.e. on all four sides for rectangular forms and around the perimeter for circular forms, is to be not less than 6 mm or that given by the following expression, whichever is the greater:

for glazing of rectangular form

$$\boldsymbol{t = 0,005b\sqrt{\beta p}}\text{ mm}$$

for glazing of circular form

$$\boldsymbol{t = 0,00559r\sqrt{p}}\text{ mm}$$

where

r = radius of the glazing, in mm

b = length of shorter side of glazing, in mm

p = design pressure in kN/m^2, as defined in *Pt 5, Ch 3, 3.1 Hull structures* and *Pt 5, Ch 4, 3.1 Hull structures*

β $= -0,17 + 0,54A_R - 0,078A_R^2$ for $A_R \leq 3$

= 0,75 for $A_R > 3$

A_R = aspect ratio of ~~window~~glazing

= *a*/*b*

a = length of longer side of ~~window~~glazing, in mm

7.8.2 For ~~windows~~ glass of trapezoidal form, the length of the ~~window~~glazing, *a*, is to be taken as the mean of the length of the longer sides. The value of *b*, the length of the shorter side, may be similarly determined.

7.8.3 Alternatively, the thickness of the glass can be determined in accordance with EN 16612 or equivalent.

7.9 Laminated glass thickness

~~7.9.1 Laminated toughened safety glass may be used having a thickness greater than the single plate toughened safety glass for the same size window, as given by:~~

$$\cancel{t_s^2 = t_{i1}^2 + t_{i2}^2 + \ldots + t_{in}^2}\ \text{~~mm~~}$$

~~where~~

~~*n* = number of laminates~~

~~t_i = thickness of laminate, in mm~~

~~t_s = thickness of equivalent single plate, in mm~~

7.9.1 Where laminated toughened safety glass is used, the total thickness is to be greater than that required for the equivalent sized glazing using toughened safety glass. The equivalent thickness of laminated toughened safety glass, t_s, in mm, is to be determined as follows:

$$t_s = \sqrt{\frac{t_d^3}{t_{max}}}$$

where

t_d = the equivalent thickness to resist deflection, in mm, to be taken as:

$$t_d = \sqrt[3]{\sum_i t_i^3}$$

t_i = the thickness of the glass ply, in mm

t_{max} = the thickness of the thickest ply in the laminate, in mm

Note that the influence of the interlayer is neglected, i.e. the coefficient of shear transfer has been assumed to be zero.

~~Alternative arrangements that do not meet the above thickness requirement will be specially considered, provided that equivalent strength and bending stiffness to that of a single, thermally toughened pane of thickness, t_s, can be demonstrated in a four-point bending test in accordance with EN-ISO 1288-3 or an equivalent recognised National or International Standard, using no fewer than ten samples. The lower limit of the 90 per cent confidence level interval for the laminated pane shall not be less than the same for monolithic toughened safety glass. Comparison shall be made based on a reference load test area per sample of 0,072 m^2. When samples tested under other standards than ISO 1288-3 are smaller, the confidence level used in the statistical reduction must be increased accordingly:~~

~~probability~~ $\cancel{= 1,0 - (1,0 - 0,90)^{0,072/asample}}$

~~The minimum number of samples tested is to be suitably increased to achieve a representative result:~~

$\cancel{n_{min}}$ $\cancel{= 10(0,072/a_{sample})}$

~~where~~

$\cancel{a_{sample}}$ ~~= area of the sample between the inner rollers~~

~~Small scale punch tests or ring-in-ring methods shall not to be used.~~

7.9.2 Alternative arrangements which do not meet the thickness requirement given in *Pt 3, Ch 4, 7.9 Laminated glass thickness 7.9.1* or which use glass other than thermally toughened safety glass will be specially considered, *see Pt 3, Ch 4, 7.9 Laminated glass thickness 7.9.3* and *Pt 3, Ch 4, 7.9 Laminated glass thickness 7.9.4*.

7.9.3 The equivalent strength and bending stiffness to that of a single, thermally toughened pane of thickness t_s, can be demonstrated in a four-point bending test in accordance with EN 1288-3 or an equivalent recognised National or International Standard, using no fewer than ten samples. The lower limit of the 90 per cent confidence level interval for the laminated pane shall not be less than the same for monolithic toughened safety glass. Comparison shall be made based on a reference load test area per sample of 0,072 m^2. When samples tested under standards other than EN 1288-3 are smaller, the confidence level used in the statistical reduction must be increased accordingly:

probability $= 1,0 - (1,0 - 0,90)^{0,072/a_{sample}}$

The minimum number of samples tested is to be suitably increased to achieve a representative result:

n_{min} $= 10(0,072/a_{sample})$

where

a_{sample} = area of the sample between the inner rollers

Small scale punch tests or ring-in-ring methods shall not to be used.

7.9.4 Alternatively, cross-sections of laminated glazing can be accepted on the basis of direct calculations predicting the result of the required bending test, *see Pt 3, Ch 4, 7.9 Laminated glass thickness 7.9.3*. Direct calculations are to be in accordance with EN 16612 Annex B or equivalent.

7.11 Openings and framing requirements

7.11.3 Where the supporting structure could be subject to deformations, the framing and mounting system is to be selected such that the glass is isolated from these deformations, that the integrity of the glazing is ensured and that the pane will not detach from the frame due to either deflection or adhesive failure. This is to be confirmed by means of a prototype test.

7.12 Deadlights and storm covers

7.12.14 Consideration can be given to proposals to install permanent deadlights made of tri-laminated glazing subject to agreement with the Flag Administration. The deadlights are to have their own independent connection to the shell or bulkhead in which they are fitted and a mechanical retaining frame is to be provided in accordance with a recognised International Standard. Glued connections are not permitted, and the frame is to be tested to four times the design pressure of the window. A drop test is to be carried out in accordance with EN 356 or equivalent where a 4 kg steel ball is to be dropped on the glass from a height of 9 metres. The test is to be repeated three times and after each impact the glazing is to be checked for penetration by the steel ball (a deadlight is regarded as being penetrated if the steel ball has completely passed through the glazing). After the impact test is carried out and a positive result achieved, the damaged deadlight is to be hydrostatically tested to 42 per cent of the design pressure to confirm that the deadlight will retain watertightness after damage.

Part 3, Chapter 7
Wind ~~propulsion systems~~ Propulsion Systems

■ *Section 1*
General

1.4 Submission requirements

(Part only shown)

Table 7.1.1 Plans and particulars to be submitted

Document	For information, *see* Note	For appraisal, *see* Note
Deck fittings for cleats, sheet winches, sheet tracks, travellers, etc. and through-deck fittings	~~X~~	X
Bowsprit arrangement with all its stays and loadings	~~X~~	X
Mast step	~~X~~	X
Mast bearing integration and its foundations in the case of ~~AeroRig/DynaRig~~ unstayed wind propulsion systems		X
Chainplates, furlers, forestay and backstay attachments	~~X~~	X

■ *Section 2*
Rig calculation requirements

2.2 Load cases

2.2.7 If the operational envelope includes the risk of ice build-up, the weight of ice is to be taken into account in all relevant load cases. Ice build-up includes an additional risk of hindering operation of control systems, and provisions are to be made to mitigate the risk of failure of the rig in these conditions.

2.3 Stress factors (SF)

2.3.1 The stress factors given in this Section are related to the Characteristic Failure Stress (CFS), minimum 0,2 per cent proof stress and minimum yield strength. The CFS is the stress at which, for the material loaded in the way it is loaded in the rig structure, the probability of breakage does not exceed 5 per cent.

2.3.2 Permissible stress for composite materials is to be calculated using:

- Permissible stress = SF CFS

For composite materials, the CFS to be used for scantling calculation purposes is to be 90 per cent of the mean first ply/resin cracking failure determined from accepted mechanical tests, or the mean values minus two times the standard deviation of not less than 5 representative samples, whichever is the lesser. All test pieces are to be representative of the product to be manufactured and details of them are to be submitted for consideration.

2.3.3 Permissible stress for aluminium materials is:

- Permissible stress = SF σ_a

where

σ_a = guaranteed minimum 0,2 per cent proof stress of the alloy in the welded condition, in N/mm^2, *see also Pt 7, Ch 2, 2.4 Mechanical properties for design 2.4.2*

2.3.4 Permissible stress for steel materials is:

- Permissible stress = SF σ_s

where

σ_s = specified minimum yield strength of the material, in N/mm^2, *see also Pt 6, Ch 2, 2.4 Mechanical properties for design*

~~2.3.3~~ 2.3.5 Stress factors (SF) are related to modes of operation (seagoing, survival) and are given in *Table 7.2.2 Stress factors (SF) for seagoing and survival conditions*.

(Part only shown)

Table 7.2.2 Stress factors (SF) for seagoing and survival conditions

Note 3. Where an element is subjected to a combined load, such as bending and compression, this combination is also to be considered using $\frac{\sigma_b}{\sigma_y} + \frac{\sigma_a}{\sigma_c}$

Part 4, Chapter 2
All Yachts

■ *Section 10*
External glass balustrades

10.1 General

10.1.1 Attention is drawn to relevant requirements of National and International Standards concerning the construction of barriers using glass, as well as applicable Statutory Regulations for the Protection of Crew, *see Load Lines, 1966/1988 - International Convention on Load Lines, 1966*, as Amended by the Protocol of 1988 and its Protocol of 1988.

10.1.2 The requirements of this Section apply solely to external glass balustrades. External glass balustrades are barriers constructed with glass that are used on exposed decks.

10.1.3 Free-standing glass balustrades are not to be situated in areas deemed essential for the operation of the craft. Such areas include mooring decks, lifeboat decks, external muster stations and in the vicinity of davits. Infill glass balustrades may be situated in these areas subject to the agreement of the Flag Administration. Where external glass balustrades are not to be used, more traditional bulwarks or guard rails are to be fitted in accordance with *Pt 3, Ch 4, 8 Bulwarks, guard rails and other means for the protection of crew.*

10.1.4 In general, glass balustrades are not to be situated in the forward quarter of the freeboard deck.

10.1.5 Glass is to be manufactured in accordance with the requirements given in ISO 11336-1 *Large yachts – Strength, weathertightness and watertightness of glazed openings – Part 1: Design criteria, materials, framing and testing of independent glazed openings* or an equivalent recognised National or International Standard.

10.2 Design considerations

10.2.1 External glass balustrades are to be designed to resist the most unfavourable anticipated loads within service, including weather loads or personnel loads, without unacceptable deflection. Detailed plans and calculations are to be submitted clearly indicating the position, arrangement and the anticipated loads for all external glass balustrades.

10.2.2 Laminated toughened glass is to be used for the glazing of all external glass balustrades.

10.2.3 The minimum characteristic breaking strength of the glass corresponding to a 90 per cent confidence level is to be as required by *Table 2.10.1 Characteristic breaking strength of glass*.

Table 2.10.1 Characteristic breaking strength of glass

Glass type	Characteristic breaking strength N/mm^2
Thermally strengthened glass	120
Chemically strengthened glass	160

10.2.4 External glass balustrades are to be not less than 1,0 m in height.

10.2.5 External glass balustrades are to provide water freeing areas in accordance with *Pt 3, Ch 4, 9 Deck drainage*.

10.2.6 In general, openings (e.g. the gaps between panels or the gap between the deck and the bottom of a panel) should not be greater than 76 mm unless required for water freeing. Openings for water freeing are not to be greater than 230 mm.

10.2.7 Consideration is to be given to minimising the possibility of surface deterioration of the balustrade glass panels in service by means of suitable edge protection or finishes.

10.2.8 For thermally strengthened glass, *see also Pt 4, Ch 2, 10.9 Testing 10.9.3*.

10.3 Types of glass balustrade

10.3.1 The following types of glass balustrade are acceptable:

- free-standing glass balustrade;
- free-standing glass balustrade with top rail;
- barrier with infill panel.

10.3.2 A free-standing glass balustrade is clamped at the bottom of the glass panel, *see Pt 4, Ch 2, 10.8 Connections*, and free to rotate at the top.

10.3.3 A free-standing glass balustrade with a handrail is clamped at the bottom of the glass panel, *see Pt 4, Ch 2, 10.8 Connections*, and free to rotate at the top. The handrail is to be designed such that it spans between panels of glass within the balustrade so that in the event of the failure of one panel, the handrail will remain attached.

10.3.4 A barrier with an infill panel is a steel or aluminium framed structure with a glass infill panel which is supported either with a continuous edge or by isolated bolt fixings or clamps, *see Pt 4, Ch 2, 10.8 Connections*.

10.4 Loads

10.4.1 The weather load, P_{gb}, in kN/m^2, for glass balustrades is to be as required for secondary stiffeners by *Pt 5, Ch 3, Table 3.3.1 Design pressures for displacement craft* for deckhouses, bulwarks and superstructure and is not to be taken as less than 2,5 kN/m^2 for the location under consideration and orientation of the balustrade.

10.4.2 The horizontal pressure (applied perpendicular to the balustrade) due to personnel loads is to be taken as 1,5 kN/m for unpopulated areas (e.g. Owner’s sun deck) and 2,25 kN/m for populated areas (e.g. areas where people could congregate). The load is to be applied to the top of the balustrade.

10.4.3 A safety factor of 4,0 is to be applied to the personnel load.

10.4.4 A safety factor of 2,0 is to be applied to the weather load.

10.4.5 When calculating the applied bending moment, M_g, free-standing glass balustrades are to be considered as cantilever beams of unit width and infill panels are to be considered as simply supported beams of unit width.

10.4.6 The loads are to be considered as separate load cases.

10.5 Glass thickness

10.5.1 The required thickness of monolithic glass, t_{req}, is given by:

$$t_{\text{req}} = \sqrt{\frac{6Z_{\text{req}}}{1000}}\,\text{mm}$$

where

Z_{req} is the required section modulus of the glass panel, in mm^3

$$Z_{\text{req}} = \frac{M_{\text{g}} \times 10^6}{\sigma}$$

M_g is the applied bending moment for the considered load case, in kNm, *see Pt 4, Ch 2, 10.4 Loads*

σ is the characteristic breaking strength of the glass, in N/mm^2, *see Pt 4, Ch 2, 10.2 Design considerations 10.2.3*

10.5.2 The effective thickness of laminated glass, t_d, in mm, for deflection is given by:

$$t_{\text{d}} = \sqrt[3]{(t_1^3 + t_2^3 + \cdots + t_{\text{n}}^3) + 12\omega(t_1 d_1^2 + t_2 d_2^2 + \cdots + t_{\text{n}} d_n^2)}\ \text{mm}$$

where

t_1, t_2, t_n = thickness of each ply, in mm

d_1, d_2, d_n = distance between the middle of each ply and the middle of the laminated glass pane, in mm

ω = shear transfer coefficient of the interlayer, *see Pt 4, Ch 2, 10.5 Glass thickness 10.5.4*

10.5.3 The effective thickness of laminated glass, t_s, in mm, for bending is given by:

$$t_{\text{s}} = \sqrt{\frac{t_{\text{d}}^3}{t_{\text{max}} + 2\omega d_{\text{max}}}}$$

where

t_d = effective thickness of laminated glass for deflection, in mm, *see Pt 4, Ch 2, 10.5 Glass thickness 10.5.2*

t_{max} = thickness of thickest ply, in mm

d_{max} = distance between the middle of the thickest ply and the middle of the laminated glass pane, in mm

ω = shear transfer coefficient of the interlayer, *see Pt 4, Ch 2, 10.5 Glass thickness 10.5.4*

10.5.4 The shear transfer coefficient is dependent on the interlayer, where a shear transfer coefficient of 1 indicates that all the load is transferred between the plies. Common shear transfer coefficients are given in *Table 2.10.2 Shear transfer coefficient*; where an alternative interlayer is specified, the shear transfer coefficient can be obtained by means of a four-point bending test in accordance with EN-ISO 1288-3 or an equivalent recognised National or International Standard.

Table 2.10.2 Shear transfer coefficient

Load type	Family 1 (e.g. PVB)	Family 2 (e.g. Ionoplast)
Weather	0,3	0,7
Personnel - normal	0,1	0,5
Personnel - crowding	0	0,3
Note Refer to EN 16613 *Glass in building – Laminated glass and laminated safety glass – Determination of interlayer viscoelastic properties*		

10.6 Assessment

10.6.1 The effective thickness of a laminated glass panel, *see Pt 4, Ch 2, 10.5 Glass thickness 10.5.2* and *Pt 4, Ch 2, 10.5 Glass thickness 10.5.3*, is to be greater than or equal to the required thickness of a monolithic glass panel, *see Pt 4, Ch 2, 10.5 Glass thickness 10.5.1*. Alternatively, the strength of the glass balustrade can be assessed using Finite Element Analysis where the loads and safety factor are to be as required by *Pt 4, Ch 2, 10.4 Loads* in association with the glass strength given in *Pt 4, Ch 2, 10.2 Design considerations 10.2.3* and the shear transfer coefficient given in *Pt 4, Ch 2, 10.5 Glass thickness 10.5.4.*

10.6.2 For free-standing glass balustrades, a post-failure check is to be carried out in accordance with *Pt 4, Ch 2, 10.9 Testing 10.9.2*.

10.7 Balustrade stanchions and top rail

10.7.1 Where fitted, balustrade stanchions are to have adequate strength to resist the anticipated loads specified in *Pt 4, Ch 2, 10.4 Loads*.

10.7.2 Where fitted, the top rail is to be sufficiently stiff so as not to deflect more than $L_b/96$ when subject to the personnel loads specified in *Pt 4, Ch 2, 10.4 Loads*, where L_b is the span of the top rail between stanchions.

10.7.3 The top rail minimum section modulus is to be greater than:

$$Z = \frac{141 q_k L_b^2}{f_\sigma \sigma_o} \quad \text{cm}^3$$

where

q_k = line load on top rail, in kN/m, determined based on the personnel loads and associated safety factor given in *Pt 4, Ch 2, 10.4 Loads*

L_b = the span of the top rail between stanchions, in m

f_σ = bending stress coefficient, not to be taken less than 0,6

σ_o = specified minimum yield stress, in N/mm^2

10.8 Connections

10.8.1 The connections of external glass balustrades are to be designed in accordance with a recognised National or International Standard in association with the loads given in *Pt 4, Ch 2, 10.4 Loads*. Typical examples of connection design are given in *Table 2.10.3 Typical glass balustrade connections*.

10.8.2 Where sealant is used in association with a clamping system, the minimum depth of the clamp is to be 100 mm for free-standing glass balustrades and 50 mm for infill panels (i.e. 50 mm for each clamp top and bottom).

10.8.3 The strength of connection designs is to be verified using a prototype strength test, *see Pt 4, Ch 2, 10.9 Testing 10.9.4*. Where a designer proposes to change a design including, but not limited to, a change in clamp size, bolt size, sealant type, overlaps, clearance and manufacturer, the prototype test is to be repeated. Where testing is impractical or where the proposed connection design is unusual, Finite Element Analysis is to be used to confirm the strength of the connection.

Table 2.10.3 Typical glass balustrade connections

Type of glass balustrade	Connection type	
Infill panel	Bolt fixing	*see Figure 2.10.1 Bolt fixing*
	Clamp fixing	*see Figure 2.10.2 Clamp fixing*
Free-standing	Continuous fixing clamp	*see Figure 2.10.3 Continuous fixing clamp*
	Alternative clamping system	*see Figure 2.10.4 Alternative clamping system*

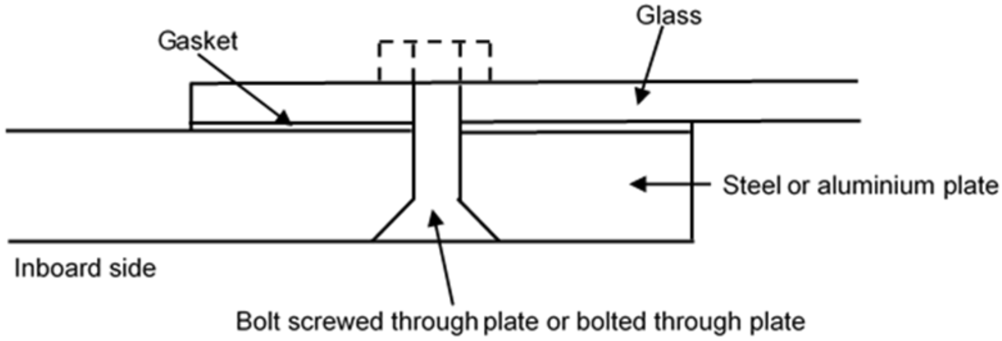

Figure 2.10.1 Bolt fixing

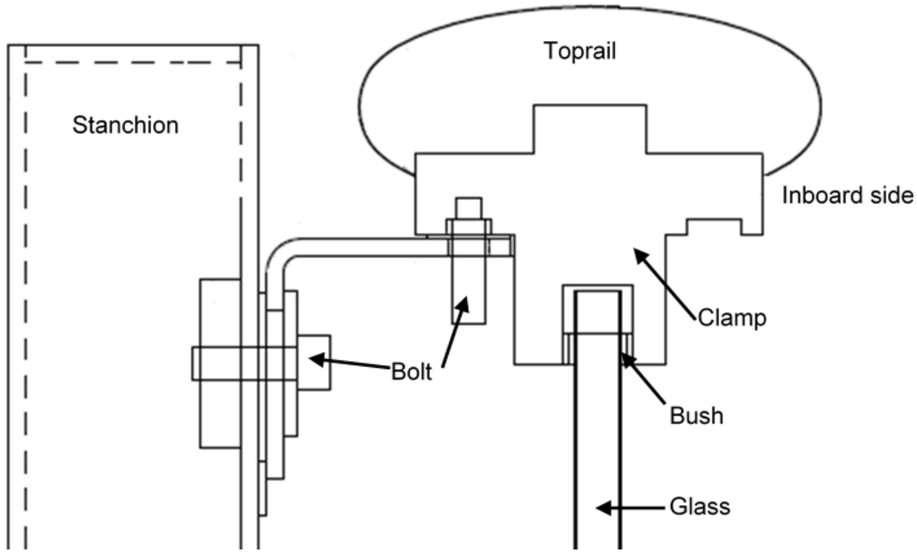

Figure 2.10.2 Clamp fixing

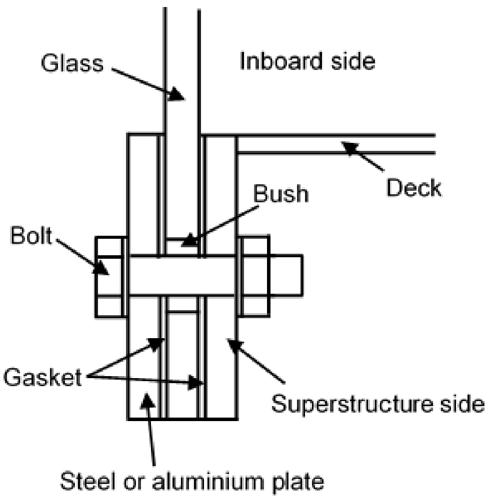

Figure 2.10.3 Continuous fixing clamp

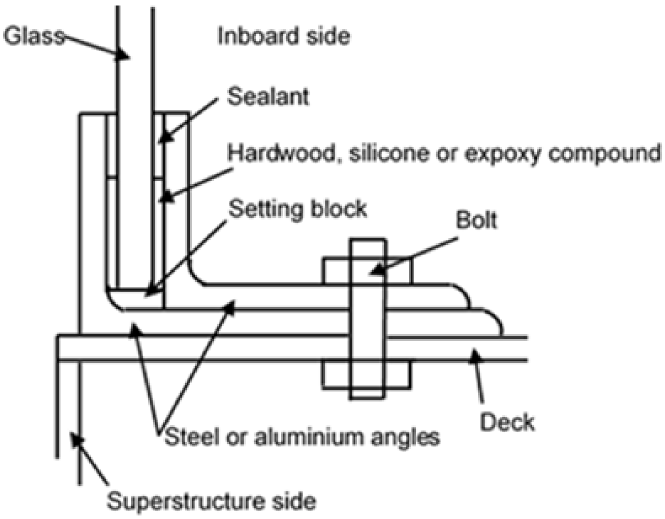

Figure 2.10.4 Alternative clamping system

10.9 Testing

10.9.1 External glass balustrades are to be subjected to a prototype pendulum test in accordance with EN 12600 G*lass in building – Pendulum test – Impact test method and classification for flat glass* or an equivalent recognised National or International Standard utilising a drop height of not less than 1,2 metres. The glass is not to fracture, no cracks are to form and the glass is to be retained in its frame/retaining arrangement. Note that the actual arrangement of glass and connections is to be tested.

10.9.2 Free-standing glass balustrades are to be assessed for post-failure strength where failure is to be induced in one glass ply and the impact test is to be repeated. The remaining glass ply or plies are not to fracture, no cracks are to form and the glass is to be retained in its frame/retaining arrangement.

10.9.3 Where it is proposed to use thermally strengthened glass, the failure mode of the glass balustrade is to be assessed where failure is to be induced in one of the plies. The glass is to fail in such a way that the glass fragments do not detach from the balustrade.

10.9.4 External glass balustrades (including both glass and retaining arrangement) are subject to a prototype strength test where the test pressure is taken as the design pressure multiplied by the safety factor, *see Pt 4, Ch 2, 10.4 Loads*. The glass plies are not to fracture, no cracks are to form and the glass is to be retained in its frame/retaining arrangement and the frame/retaining arrangement is not to detach from the deck.

Part 6, Chapter 6
Hull Girder Strength

■ *Section 1*
General

1.7 Information required

1.7.1 In order that an assessment of the longitudinal strength requirements can be made, the following information is to be submitted, in LR's standard format where appropriate:

(a) General arrangement and capacity plan or list, showing details of the volume and position of centre of gravity of all tanks and compartments.

~~(b) Bonjean data, in the form of tables or curves, for at least 21 equally spaced stations along the hull. A lines plan and/or tables of offsets may also be required.~~

~~(c)~~(b) Details of the calculated lightweight and its distribution.

~~(d)~~(c) Details of the weights, fore and aft extents, and centres of gravity of all deadweight items for each of the main loading conditions. It is recommended that this information be submitted in the form of a preliminary Loading Manual~~, to include the calculated still water and dynamic bending moments and shear forces~~.

(d) Still water bending moments and shear forces for each of the main loading conditions. It is recommended that in the preliminary Loading Manual, a suitable margin be applied to the still water bending moments and shear forces to allow for changes between the preliminary and final loading manuals. The responsibility for the correctness of the submitted still water bending moments and shear forces rests with the designer.

Part 7, Chapter 6
Hull Girder Strength

■ *Section 1* General

1.7 Information required

1.7.1 In order that an assessment of the longitudinal strength requirements can be made, the following information is to be submitted, in LR's standard format where appropriate:

(a) General arrangement and capacity plan or list, showing details of the volume and position of centre of gravity of all tanks and compartments.

~~(b) Bonjean data, in the form of tables or curves, for at least 21 equally spaced stations along the hull. A lines plan and/or tables of offsets may also be required.~~

~~(c)~~(b) Details of the calculated lightweight and its distribution.

~~(d)~~(c) Details of the weights, fore and aft extents, and centres of gravity of all deadweight items for each of the main loading conditions. It is recommended that this information be submitted in the form of a preliminary Loading Manual~~, to include the calculated still water and dynamic bending moments and shear forces~~.

(d) Still water bending moments and shear forces for each of the main loading conditions. It is recommended that in the preliminary Loading Manual, a suitable margin be applied to the still water bending moments and shear forces to allow for changes between the preliminary and final loading manuals. The responsibility for the correctness of the submitted still water bending moments and shear forces rests with the designer.

Part 8, Chapter 6
Hull Girder Strength

■ *Section 1* General

1.7 Information required

1.7.1 In order that an assessment of the longitudinal strength requirements can be made, the following information is to be submitted, in LR's standard format where appropriate:

(a) General arrangement and capacity plan or list, showing details of the volume and position of centre of gravity of all tanks and compartments.

~~(b) Bonjean data, in the form of tables or curves, for at least 21 equally spaced stations along the hull. A lines plan and/or Tables of offsets may also be required.~~

~~(c)~~(b) Details of the calculated lightweight and its distribution.

~~(d)~~(c) Details of the weights, fore and aft extents, and centres of gravity of all deadweight items for each of the main loading conditions. It is recommended that this information be submitted in the form of a preliminary Loading Manual~~, and that it includes the calculated still water and dynamic bending moments and shear forces~~.

(d) Still water bending moments and shear forces for each of the main loading conditions. It is recommended that in the preliminary Loading Manual, a suitable margin be applied to the still water bending moments and shear forces to allow for changes between the preliminary and final loading manuals. The responsibility for the correctness of the submitted still water bending moments and shear forces rests with the designer.

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